VENUS: A Novel Seafloor Observing System for Straits of Georgia and Juan de Fuca

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Abstract
VENUS is an innovative approach to observing the oceans. Scientific instruments under the sea surface and on the sea floor will connect directly to a data clearinghouse and to the computers of scientists via cables. These cables will provide the necessary electrical power and interactive communication. Synoptic, multi-disciplinary observations will be available in real time to participating scientists, resource managers and educators anywhere on the Internet. Scientists will be able to change or start measurements in response to episodic events, from their laboratories, at any hour of the day or night. Deployment is planned for three locations in the Straits around Vancouver Island starting in 2004. The locations will support internationally significant research on a range of topics. Phenomena include the effects of climate change on an important marine ecosystem, the response of a major delta to storm, seismic, and hydrological events, and the processes controlling productivity in a large estuarine system. With VENUS, we take a major step up from the limiting and sparse observations from ships and moored instruments. VENUS has five essential elements:

1. Fibre-optic cables providing power and two-way high speed communications.
2. Seafloor instrument arrays with a standard instrument suite and study-specific devices.
3. Mid-strait vertical profiling packages.
4. An archive centre with data management and distribution providing a user interface and long-term access.
5. An operations centre to monitor and control all sub-sea and shore station elements.

The system will be capable of future expansion at two levels: researchers or instrument developers will able to attach new or complementary equipment; and the data distribution and archive will allow links or integration with existing and planned ocean databases. The VENUS system design is partially based on the work of the NEPTUNE System Engineering Team that is designing a 3000-km /30-node observatory network proposed off the west coast of North America.